National Significant Wildland Fire Potential Outlook

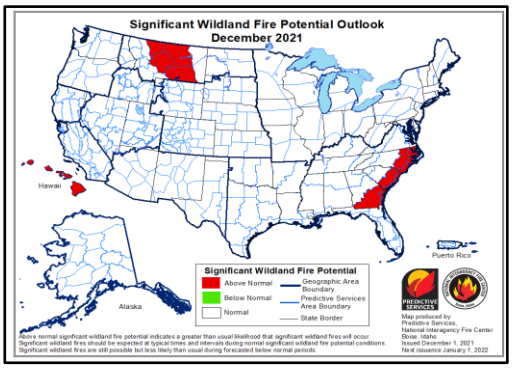
Predictive Services
National Interagency Fire Center

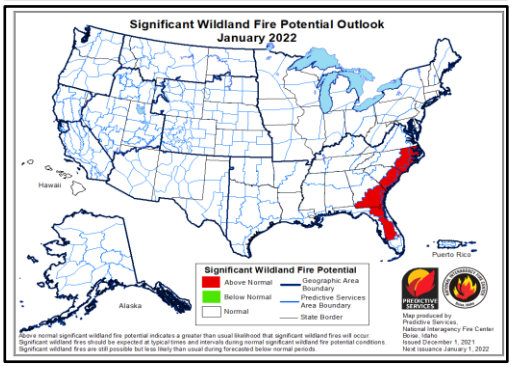
Issued: December 1, 2021
Next Issuance: January 1, 2022

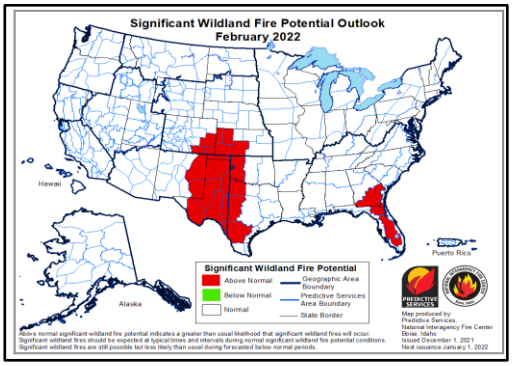
Outlook Period – December 2021 through March 2022

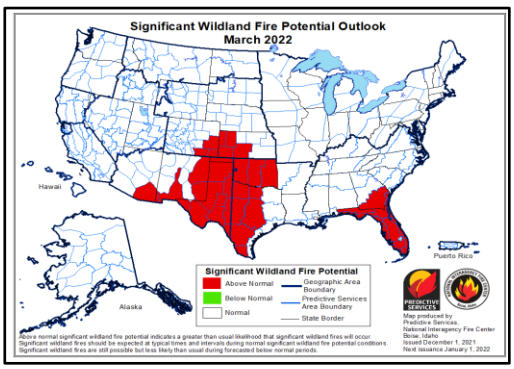
Executive Summary

The significant wildland fire potential forecasts included in this outlook represent the cumulative forecasts of the ten Geographic Area Predictive Services units and the National Predictive Services unit.









Significant fire activity remained minimal in November and year-to-date number of fires and acres burned remain below their respective 10-year averages. Large fires were largely confined to Southern Area, with active prescribed burning in all geographic areas during November. Critical fire weather conditions were observed periodically on the High Plains, with multiple weak to moderate Santa Ana wind events in southern California.

More than 90% of the West is in drought, with almost half of the West in the highest two categories of drought. Most of the CONUS had below average precipitation except notably in Washington, south Texas, and the Florida Peninsula. Temperatures were also warmer than average across the West and most of the Plains, with cooler than average temperatures in most of Southern and Eastern Areas. Abnormally dry and drought conditions expanded in the Carolinas due to the prevalence of dry, post-frontal conditions throughout November across much of the Southern Area.

Climate outlooks for winter indicate above normal temperatures are likely along the southern tier of the CONUS, with the highest probabilities likely in the Southeast. Below normal temperatures and above normal precipitation remain expected across the Pacific Northwest and through portions of the northern Rockies and northern High Plains. The Great Lakes is also likely to experience above normal precipitation through February. Below normal precipitation will likely accompany above normal temperatures across the southern half to one-third of the western US, through much of Texas, along the Gulf Coast, and into the Carolinas.

Above normal significant fire potential will continue on the plains of central and eastern Montana in December as this area remains snow-free with periodic dry and windy conditions. Additionally, leeward sides of the Hawai'ian Islands and the Coastal Plain in the Carolinas and Georgia are forecast to have above normal significant fire potential in December. Through winter, above normal significant fire potential is expected to expand into much of Florida and Georgia, while returning to normal potential in the Carolinas.

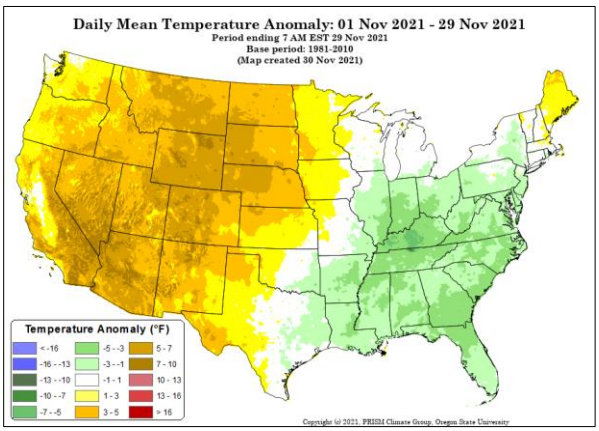
Critical fire weather could bring periods of elevated fire potential to the southern Plains in December and January. However, there is greater confidence in above normal significant fire potential emerging by February across eastern New Mexico, west Texas, western Oklahoma, southeast Colorado, and western Kansas. Above normal potential is likely to expand eastward across Texas and Oklahoma and to lower elevations in

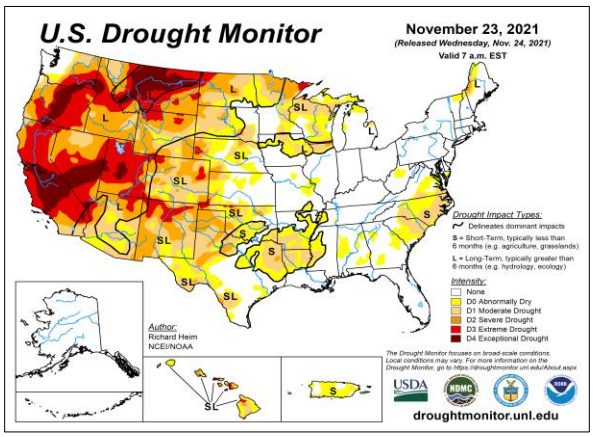
southeast Arizona and southern New Mexico during March. This above normal potential will be acute during wind-driven events.

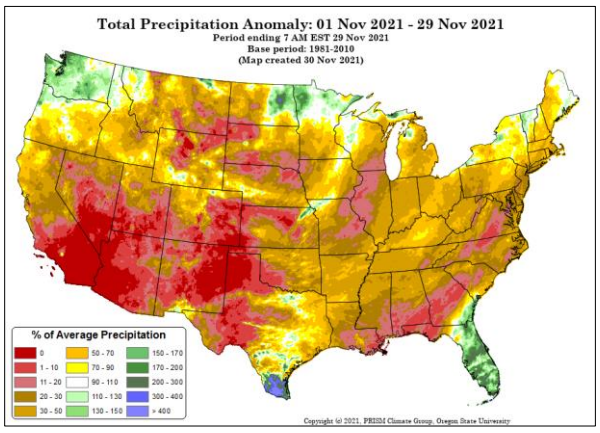
Past Weather and Drought

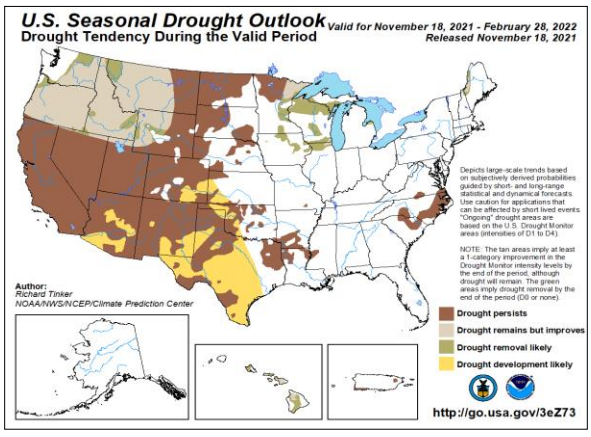
More than 90% of the West remains in drought as warmer and drier than normal conditions dominated much of the region during November. Abnormally dry and moderate drought conditions expanded across portions of the Carolinas, Georgia, Alabama, and the Lower Mississippi Valley, with below normal rainfall observed. Much of the High Plains remain in drought, with drought intensifying across north-central Montana as downslope wind events exacerbated warm and dry conditions. Overall, much of the CONUS experienced below normal precipitation. However, multiple atmospheric rivers brought above normal rainfall to Washington and far northwest Oregon, including flooding in Washington, with devastating flooding, debris flows, and landslides in British Columbia. Heavy rainfall events in south Texas and the Florida Peninsula into far southeast Georgia resulted in above normal rainfall for the month as well. Additionally, south-central Alaska had a historical precipitation event in early November with some areas receiving 2 feet of rain and 8-15 feet of snow at higher elevations.

Significant fire activity was minimal during November across the US, with the national preparedness level remaining at one. Large fires were reported in multiple geographic areas, but most of the large fire activity was confined to Southern Area. Critical fire weather conditions developed across the Plains at times as downslope flow induced dry and windy conditions, including in mid-November when wind gusts exceeded 100 mph in Montana due to extremely strong downslope flow. There were multiple weak to moderate Santa Ana wind events in southern California, but no significant fires emerged. Dry and breezy post-frontal conditions were frequent across the Plains into the South that led to conducive prescribed and wildfire burning conditions. Prescribed burning was also active across all geographic areas.









Left: Departure from Normal Temperature (top) and Percent of Normal Precipitation (bottom) *(from PRISM Climate Group, Oregon State University).* **Right: U.S. Drought Monitor (top) and Drought Outlook (bottom)** *(from National Drought Mitigation Center and the Climate Prediction Center)*

Weather and Climate Outlooks

La Niña conditions are present with below average sea surface temperatures (SSTs) over much of the equatorial Pacific Ocean. The Climate Predicter Center (CPC) forecasts La Niña to continue this winter, which will likely have a major impact on this winter's weather and climate. There is also a strongly negative Pacific Decadal Oscillation (PDO), that is impacting the large-scale pattern. Other teleconnection influences, such as the Madden-Julian Oscillation and Artic Oscillation may still have roles in shaping the weather and climate patterns, but La Niña will likely remain dominant influence on the pattern.

Geographic Area Forecasts

Alaska: Normal (i.e., low to none) significant fire potential is expected in Alaska through winter.

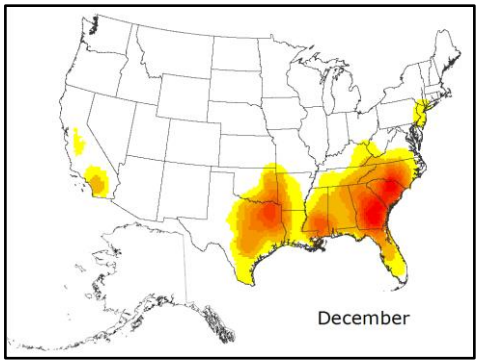
Winter settled over Alaska in November, with snow covering the entire state by month's end, except for some coastal locations in south-central and southeast Alaska. The US Drought Monitor shows no drought in Alaska, and there was no fire activity in November. Fuels are wet, frozen, or snow-covered statewide. Fire danger indices reflect little or no burning potential.

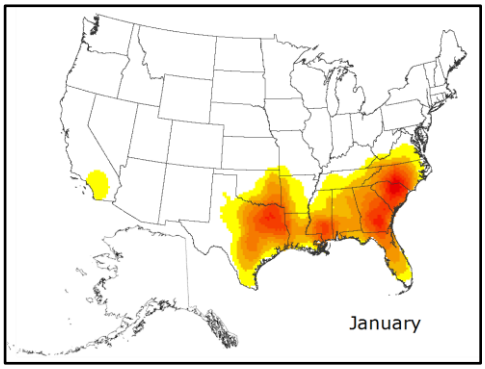
The upcoming winter will feature a building snowpack, minimal daylight until March, and bouts of very cold temperatures. Significant fire potential is expected to be normal for the next four months as Alaska is now out of fire season, with typical winter weather in the forecast. The snowpack will melt away at times over low-elevation locations near the coastline in southern Alaska, but cold temperatures and wet fuels will constrain the potential for wildfires.

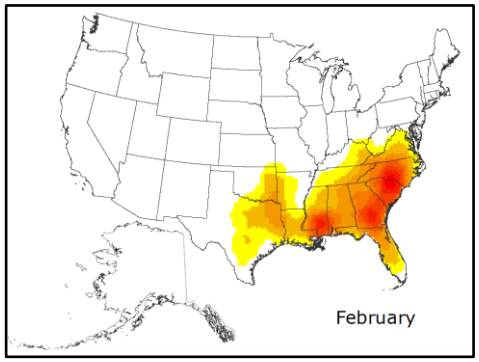
Northwest: Significant fire potential is forecast to be normal (i.e., low) through March for the Northwest Geographic Area.

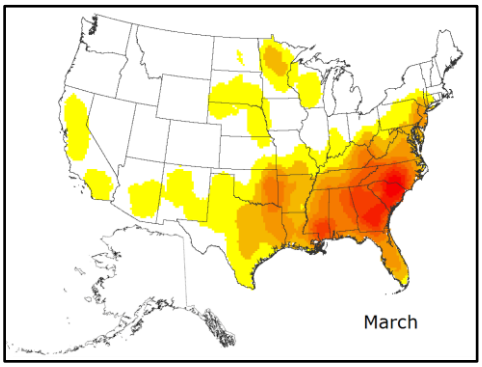
A persistent southwesterly jet stream directed plumes of moisture at Washington and British Columbia through November. As a result, almost all of Washington recorded above average rainfall for the month, with some areas west of the Cascades reporting over twice the normal monthly total. Flooding was reported in western Washington and British Columbia during these events. In Oregon, only northwest Oregon, the north Oregon Cascades, and sections of central Oregon observed near to above average precipitation in November. The remainder of Oregon, including southwest Oregon and much of eastern Oregon, was below average. Temperatures across the Northwest Geographic Area were above average for November, especially southeastern Oregon. The same was true of nearly the entire western US.

The typical seasonal decline in initial attack continued through the month at a below average level. Over 25 incidents were reported with burned area averaging only 0.1 acres. The number of private, state, and federal pile burning activities continued at a steady pace around the geographic area. No control problems surfaced, with the spread potential being very low from frequent bouts of light to heavy precipitation. Moisture limited broadcast burning opportunities and decreased human caused fires usually reported at this time of year.









Normal fire season progression across the contiguous U.S. and Alaska shown by monthly fire density (number of fires per unit area). Fire size and fire severity cannot be inferred from this analysis. (Based on 1999-2010 FPA Data)

Precipitation received in October started to boost the large fuel classes to above average moisture. West-side PSAs' large fuels are at moisture levels that will begin to limit pile burning potential, but east-side PSAs' large fuels are still dry enough to support active pile burning activities. Agricultural, broadcast, and range burning activities are limited by shading, damp surface litter and high fine fuel moistures. Fine surface fuels are compacted by moisture in the hardwood fuel types, and range fuels are damp from high humidity and overcast conditions. Most 100-hr fuels at the reporting key RAWS are at average or above average levels, which limits intensity and duration of any emerging incidents.

Long-range outlooks from NOAA and other sources suggest winter will be wetter and colder than normal for the Northwest Geographic Area. This implies fire danger will remain too low for significant fires through March.

Northern California and Hawai'i: Near normal significant fire potential is expected for North Ops through March except in December on lee sides, divides, and saddles of the Hawai'ian Islands due to dry conditions and occasionally stronger trade winds.

Conditions during November were mixed, with near to slightly above normal temperatures and varying precipitation anomalies but generally near to below normal. The storm track was active at times, with several systems impacting northern California, although abundant amounts were less widespread compared to late October. Extended warm and dry conditions towards the end of the month led to lowering dead fuel moistures and a dwindling snowpack, with ERC values near to slightly above normal but not critically dry. Shrub fuels remained flammable in some areas, but the lack of sampling provides some unknowns in that fuel type. Herbaceous green-up, which was initiated in October, remained robust generally below 2500 ft and served as a mitigating factor for surface fire spread. Gusty wind and low humidity periods occurred on November 16-17, November 20-21, and November 23-24.

The weather outlook from December through March is for near to below normal temperatures and near normal precipitation. It will be hard for dead fuel moisture to get back to below normal for an extended period due to timely moisture intrusions, lower sun angles, and shorter days. Herbaceous fuels across the low elevations will also remain in a green-up state. Shrub or woody moisture readings should remain in a mixed flammable state. There is the possibility of some gusty wind-low humidity events aligning with marginally dry fuels, but that is expected to be very localized within portions of the Coastal Range, Bay Area, Sacramento Valley, and lower western slopes of the Cascades and Sierra Nevada.

Sea surface temperature (SSTs) anomalies surrounding the Hawai'ian Islands are currently mixed and average out to near normal. Temperatures throughout the region are expected to be near to above average from December through March. Dry weather since April has led to abnormally dry and drought conditions across the region, especially on the lee sides, divides, and saddles of the islands. Rainfall was below normal across most of the islands during November and continued to exacerbate the dryness. The four-month weather outlook calls for above average precipitation December through March, especially along the windward side of the islands as the trade winds are typically enhanced during La Niña. Leeside areas could continue to experience periods of dry conditions during December and possibly January due to downsloping effects from stronger trade winds. Significant fire potential is forecast to be above normal on lee sides, divides, and saddles during December then projected to be normal January through March as the rainy season fully evolves.

Southern California: Significant fire potential will be near normal across the entire geographic area from December through March.

Just like October, the weather pattern was very progressive in November, with a series of upper-level Pacific troughs and high-pressure areas moving into the West Coast from the Pacific Ocean. However, unlike October, the troughs moved inland farther to the north and the areas of high pressure were much stronger. Record heat was observed across portions of the geographic area November 11-14 as an unseasonably strong upper-level high-pressure area was just off the California coast. For the month, temperatures were well above normal across the mountains and deserts and within a couple degrees of

normal across most coastal and valley areas. Scattered showers moved across central California with the Pacific troughs during the first couple weeks of the month. Southern California received well below normal precipitation for the month, with little to no precipitation across much of the geographic area. Like October, the snow level over the Sierra was mainly above 8,000 feet. There were gusty south to west winds associated with the Pacific troughs and light offshore flow with the areas of high pressure. There was a weak Santa Ana wind event on November 21-22 and a moderate event November 24-26.

There continues to be very little change in the drought across the region. From Los Angeles County northward, there is extreme to exceptional drought. East and south of Los Angeles County, there is moderate to severe drought. For the month, the 1,000-hr dead fuel moisture was mainly near to above normal across central California and between normal and the 10th percentile across southern California. The 100-hr dead fuel moisture was mainly between normal and the 10th percentile across the geographic area by the end of the month. Live fuel moisture values remain mostly between 50% and 70%.

Sea surface temperatures (SSTs) warmed to a little above normal off the West Coast, which most likely caused the strong upper-level high-pressure area to remain just off the California coast in November. Forecast models show that SSTs off the West Coast will cool dramatically over the next couple of months, and SSTs in the Gulf of Alaska will remain well below normal. This will most likely cause the high-pressure area to shift farther to the west allowing Pacific troughs from the Gulf of Alaska to move inland farther south into California. Most guidance indicates warmer and drier than normal conditions for southern California through the winter months, but there could be extended periods of near to below normal temperatures and near to above normal precipitation. Precipitation is unlikely to be excessive due to La Niña conditions in the Equatorial Pacific. The amount of Santa Ana wind events will most likely remain below normal through the winter months.

Northern Rockies: Significant wildland fire potential is expected to be normal in the Northern Rockies Geographic Area in December, except for PSAs 10, 11, 13, and 14. All the Northern Rockies Geographic Area is expected to return to normal fire potential in January, although there is slight potential any of the four aforementioned PSA's to have above normal potential if they continue in drought status, and temperatures are above normal.

La Niña has brought changes to portions of the Northern Rockies Geographic Area as northern Idaho and northwest Montana have seen normal to above normal precipitation. However, east of the Divide, precipitation has been scarce. ERC values for these areas are well above normal, with 100-hr dead fuel moisture only around 13%. With typical wind events possible, the potential for significant wildfires is present. There has been some drought relief for northern Idaho and northwest Montana, even though long-term drought persists. Year-to-date rainfall in these areas is near to well above normal, with significant gains since October. North Dakota has also seen drought relief and is out of season at this point. Areas west of the Divide are generally out of season as well.

Eastern portions of the Northern Rockies Geographic Area have fuel moistures below average, as mentioned above. Fine fuels exposed to the sun and wind will continue to see drying without any snow cover, but sheltered areas remain moist. Live fuels are cured in most locations. High elevations east of the Divide have seen snow and snowpack in localized areas that has allowed fire season to end in these areas. No significant fire activity is ongoing currently. There is periodic initial attack, generally with fires less than an acre.

With La Niña forecast to continue into the spring, northern and central Idaho and Montana, west of the Divide, look to continue with above normal chances for precipitation, and possibly cooler than average temperatures. However, chances drop off significantly east of the Divide, leaving high uncertainty for precipitation in central and eastern Montana, as well as North Dakota and northwest South Dakota, but forecasts are for near normal precipitation and near to below normal temperatures. In December, central Montana has potential, even if it is slight, for significant wildfire activity. Inhibiting factors are shorter days and cooler temperatures. However, these may not be enough if snow covering is lacking through the month. By January, chances are that temperatures will be cold enough and there should be snow cover to allow all PSAs to go out of season.

Great Basin: Significant wildfire potential will remain mostly low (normal) through March. Significant long-term drought has improved but persists across much of the Great Basin.

Temperatures over the last 30 days have been above normal across the Great Basin. Cool and wet storms moved across the Great Basin throughout October, with the wettest storm the last week of the month, but conditions have warmed and dried in November. Precipitation increased to over 200-400% of average across much of the northern half of the Great Basin late in October to early November and remained near normal across southern Utah and the Arizona Strip. However, over the last two to three weeks, precipitation has been well below normal in most areas of the Great Basin. Only small portions of central and southern Idaho have seen near normal precipitation. The storm track continues to favor the northern half of the Great Basin, with the driest areas over the southern third of the geographic area.

The active weather pattern in October somewhat modified the long-term drought across the Great Basin, but significant drought concerns remain. Extreme to exceptional drought continues over much of the southern and eastern half of Nevada, much of Utah, and parts of central Idaho. Severe drought exists in nearly all other areas of the Great Basin. These drought areas are expected to improve across Idaho into Wyoming and along the Utah and Nevada borders over the next few months but likely remain unchanged farther south.

Fuel moisture has returned to normal in most areas due to the drier and warmer weather, after the wet weather in late October. Normal fuel moisture for this time of year would indicate low fire potential in all fuel types. However, wet and cooler weather is expected to return by early to mid-December and should gradually improve these conditions, especially over the northern two-thirds of the Great Basin. Southern portions of the Great Basin may see cooler temperatures and light showers from these systems as well. Rains that occurred in August into September over the eastern half of the Great Basin triggered new areas of fine fuel growth. These fine fuels could add to the fine fuel load for next fire season, depending on winter compaction. Additionally, the heavy October precipitation moistened lower elevation soils in some areas to help possibly propagate new growth next spring, depending on precipitation over the next few months. Otherwise, carryover fine fuel loading remains low across Nevada, Idaho, and Wyoming, with little if any carryover expected to be an issue heading into the winter and next fire season.

Overall fire activity remains low across the Great Basin, and the geographic area remains at PL1. A few small fires occur every few days, but they have been easily extinguished. The shift toward increased prescribed burning continues across the Great Basin.

La Niña has developed and is expected to continue to drive the weather pattern over the next few months. Forecasts are calling for overall cooler and wetter than normal conditions across the northern third of the Great Basin through March. How far south the wetter conditions track will fluctuate at times, with the best chances of more continuous wet weather across Idaho, Wyoming, far northern Nevada, and northern Utah. Warmer and drier conditions are predominantly expected over the southern half of the Great Basin through March.

Southwest: Normal significant fire potential is anticipated across most of the geographic area through January. Areas of above normal potential are expected in the southern High Plains by February that will continue into March, with areas of above normal emerging across the southern tier of the region in March as well.

Although a wetter period from late September into mid-October helped lower significant fire potential for much of the region, the past 60 days, especially the past month, has been very dry with minimal significant precipitation regionally amid very mild temperatures. This is not unusual during a La Niña fall. Overall, the expectation is for a continuation of this general trend through the winter months into the early spring period. There will be periodic weather pattern changes that will bring cooler temperatures and wetter conditions, especially to northern portions of the Southwest Area during winter. However, both eastern New Mexico and west Texas will continue to be drier and warmer than average during the next few months.

Areas across the eastern plains of New Mexico into west Texas will see temporary, brief periods of above normal significant fire potential during December and January. By February, it is expected that more of these areas will see significant fire potential rising and will be of longer duration coincident with warmer temperatures, continued drier than normal conditions, and downslope wind periods. This will be due to a windy pattern and dry fuel conditions that are typical during a La Niña winter across the eastern plains of the geographic area. By March, due to the likely dryness across the southern tier, areas from southern Arizona eastward across southern New Mexico will also have above normal significant fire potential.

Rocky Mountain: Significant wildland fire potential across the Rocky Mountain Area (RMA) is expected to be normal from December through January. However, the first half of December could be elevated at times along the Front Range and across the High Plains during warmer, drier, and windy periods before snow eventually covers the fuels in these areas. Portions of southeast Colorado and western Kansas are forecast to have above normal significant wildland fire potential for February and March primarily due to the persistence of above normal temperatures and below normal precipitation expected during the outlook period that will interrupt any green-up and keep fuels receptive to carry fire during wind events.

In September, temperatures were above normal over most of the RMA, with near normal temperatures continuing across western portions of the RMA in October. By November, the pattern flipped, with the warmest anomalies appearing across the western two-thirds of the geographic area. The greatest departures from normal in the past 90-day period were observed across portions of the Plains, from western South Dakota through the Nebraska Panhandle and across eastern Colorado and western Kansas. The warmer temperatures consistently developed with downslope wind events that accompanied troughs of low pressure that moved over the region.

In late September and October, the pattern change also brought above normal precipitation to the northern half of the RMA, including Wyoming and South Dakota. Even with improvements in drought noted across northwest Colorado, Wyoming, and South Dakota, the US Drought Monitor continues to portray extreme drought in several areas. There have been significant improvements in South Dakota, but on the High Plains of eastern Colorado into western Kansas and the Nebraska Panhandle, the dry conditions have expanded in coverage and drought has intensified. The dry signature is also reflected in soil moisture anomalies that indicate continued drying across eastern Colorado, western Kansas, and most of Nebraska.

Despite the overall warm, dry, and breezy weather over the past two months, there has been average to below average wildfire activity in the Rocky Mountain Area the past 60 to 90 days. Snowpack is beginning to accrue in the mountains where conditions are generally out of season, but there has been some minimal fire activity along the northern Front Range and foothills in Colorado. The last half of October had conditions that were more favorable for prescribed burning, and several prescribed burns were noted in central Colorado.

Following the more significant rainfall amounts observed at the end of the summer, fuels and fire danger dipped from the 97th percentile back to normal for a brief time and then climbed back up again in September and October once the fine fuels cured out east of the Continental Divide, especially on the Plains during the pre-harvest period. Fire danger in the southern half of the RMA continues near the 80th to 90th percentile, with even higher fire danger indices along the Front Range of Colorado. However, adequate humidity recoveries overnight and shorter burning periods have mitigated fire danger from becoming critical except for brief periods of time during windy cold frontal passages. Harvesting operations on the Plains will increase potential for ignitions due to more equipment being in the fuel beds, but in central and eastern South Dakota, it has been too wet to harvest in October.

For the winter, La Niña is expected to split the RMA from north to south with the warmest and driest influence and conditions remaining across southern Colorado along with most of Nebraska and Kansas, while cooler and more moist weather should be confined to Wyoming, South Dakota, and portions of northern Colorado. Climate models also indicate a gradual weakening of the La Niña signature to more of an ENSO neutral state in early spring. This strongly suggests that an onset of a transitional and severe weather pattern with strong winds, frontal passages and attendant lightning may set in across the central Great Plains as early as February or March.

Since September, the northern half of the geographic area has benefitted from several wet events, including winter storms, but the southern half has not seen appreciable moisture this fall. The expectation for the RMA outlook is normal significant fire potential through January, though there could be a period in the first part of December when the potential may elevate for a few days along the Front Range and across the High Plains. This is due to the shortfall of moisture during the late summer and fall and how that has impacted the condition and availability of fuels in these areas. During dry and windy episodes that occur before snow covers the fuels, there will be brief periods of elevated fire potential, but overall anticipation is it will be near normal potential in this area through March. While northern portions of the RMA and areas generally west of the Divide can expect normal significant wildland fire potential, February and March will present an uptick to above normal potential for portions of southeast Colorado and western Kansas due to the forecast persistence of abnormally warm and dry conditions during the winter months, combined with the strong winds and lightning that are expected. The history of large fire occurrences over the central Great Plains also shows a big increase typically starting in February and persisting through April.

Eastern Area: Thirty to 90-day soil moisture and precipitation anomalies were below normal across parts of the central and northeast Great Lakes as well as the Mid-Mississippi Valley at the end of November. Long-range drought conditions persist across the north-central Great Lakes and far northern New England.

Fuel moisture levels may remain below normal across portions of the central Great Lakes and Mid-Mississippi Valley if increased precipitation coverage and frequency do not occur. The fall fire season may also linger into December across drier parts of the Mid-Mississippi Valley if precipitation events do not increase.

Near to above normal precipitation is expected over the majority of the Eastern Area through winter. Drier than normal trends may develop over the southeastern Mid-Atlantic States February into March, and cooler than normal temperatures are forecast across the Upper Midwest through the winter. Warmer than normal trends are expected to develop across the southern tier of the geographic area January into March. Near normal significant fire potential is forecast across the majority of the geographic area December into March. Periods of elevated fire potential may linger into December across the Mid-Mississippi Valley.

Southern Area: Above normal significant fire potential is expected for parts of the Coastal Plain in December, gradually spreading into much of Florida January – March. Above normal potential is also forecast for west Texas and western Oklahoma by February, expanding eastward by March. Otherwise, near normal significant fire potential is likely.

Fire activity has gradually increased over the past two weeks, prompting an increase to PL 2. Otherwise, during the last week of November, widespread wetting rain fell from east Texas through much of the Tennessee Valley. Fuels remain very dry across north Texas and most of Oklahoma, as well as the Piedmont and Coastal Plain of the Carolinas into Georgia and much of Florida, with little to no rainfall over the past two weeks. KBDI values across west Texas and western Oklahoma are 500-600, with some locally drier pockets approaching 700, while 100-hr dead fuel moisture remains 6-10%. It is moderately dry east of the Appalachians from the Carolinas south through most of Georgia and into north Florida, where little rainfall has also occurred over the past week, and KBDI values are 400-600 across much of this region.

Initially, given the shorter days and burning periods of December into January, fire concerns should remain confined to the finer fuels of the Coastal Plain, but by February and March, there is a concern that critical fire weather conditions will expand across parts of Texas and Oklahoma, as well as into much of Florida. The dry conditions of late fall are expected to continue across much of the region through early winter, as the effects of a moderate La Niña combine with the negative phase of the Pacific Decadal Oscillation. The combination is expected to produce much warmer and drier than normal conditions for a significant portion of the geographic area through winter. Near normal precipitation is expected across the northern and portions of the geographic area, from the Tennessee Valley to the western Appalachians.

Outlook Objectives

The National Significant Wildland Fire Potential Outlook is intended as a decision support tool for wildland fire managers, providing an assessment of current weather and fuels conditions and how these will evolve in the next four months. The objective is to assist fire managers in making proactive decisions that will improve protection of life, property, and natural resources, increase fire fighter safety and effectiveness, and reduce firefighting costs.

For questions about this outlook, please contact the National Interagency Fire Center at (208) 387-5050 or contact your local Geographic Area Predictive Services unit.

Note: Additional Geographic Area assessments may be available at the specific GACC websites. The GACC websites can also be accessed through the NICC webpage at:
http://www.nifc.gov/nicc/predictive/outlooks/outlooks.htm